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Plotting a Spectrum Revolution

By Thomas Kidd - [October-December 2008](#)

Adm. Vern Clark wrote about "revolution" while serving as Chief of Naval Operations. Today, the retired CNO still refers to revolution when publicly speaking about his efforts to change and improve business processes within the Navy. He confessed that, even as the second longest serving CNO, he didn't have time for "evolution," which is why he unapologetically chose revolution.

Evolution and revolution are very different processes. While evolution is a process of gradual and relatively peaceful social, political or economic advance, revolution is a sudden, radical and absolute change.

Evolution in business processes provides time for people to accept slow methodical changes. On the other hand, revolution is generally difficult for people to accept due to rapid change and is often viewed negatively.

Revolution is used to describe change in many business processes. In fact, modern computers and software are results of a revolution that led to the Silicon Valley high-tech empires in Northern California.

The convergence of cellular technology, the Global Positioning System (GPS) and a long list of services, technologies and devices are setting the stage for a wireless revolution that will influence our personal lives, business processes and the capabilities of the Marine Corps and Navy, in such a way not seen since the introduction of modern warfare.

The Marine Corps and Navy have global responsibilities, and they require a significant number of radio frequencies to conduct their worldwide operations. All radio frequencies are recognized by international law as belonging to each and every nation.

U.S. forces face access issues in each country in which they operate due to competing civilian or government users of national spectrum allocations. For example, when the Marine Corps and Navy are operating in Japan, the Japanese government regulates the radio frequencies U.S. naval forces can use. The same is true for Australia, Republic of Korea and all sovereign nations.

But even though radio frequencies are allocated, a large portion of the assigned spectrum is used sporadically, and there are wide variations in the use of assigned spectrum. The limited available spectrum and the inefficiency of its usage demands a new methodology to exploit existing wireless spectrum "opportunistically."

The wireless revolution is just beginning. A number of radical changes in the use of the electromagnetic spectrum, or radio frequencies, will soon have "dynamic" effects on naval capabilities. Dynamic Spectrum Access (DSA) refers to radios and other wireless capabilities that dynamically adjust to the spectrum environment and access radio frequencies that are unused or underused.

Access to spectrum, along with the corresponding capabilities and bandwidth may, by today's standards, be almost limitless. The Defense Advanced Research Projects Agency (DARPA) has developed DSA capability known as "Next Generation" or "XG," which promises significant benefits to forward deployed Marines and Sailors. Commercial companies are also developing DSA capabilities.

The goals of the XG program are to develop both the enabling technologies and system concepts, along with new waveforms to provide dramatic improvements for assured military communications in support of worldwide operations, according to DARPA.

The XG program approach plans to investigate methods to leverage the technology base in microelectronics, with new waveforms and medium access and control protocol technologies, to construct an integrated system.

The proposed program goals are to develop, integrate and evaluate the technology to enable equipment to automatically select spectrum and operating modes to minimize disruption to existing users and to ensure that U.S. forces can fully exploit their superiority and investment in information

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tecnology.

DSA will revolutionize naval wireless capabilities by providing greater access to limited spectrum resources. Today, there are considerable obstacles to employing DSA. International and national spectrum governing bodies control spectrum use through rigid radio frequency allocations that often result in one frequency per wireless use.

The benefits of DSA to the Marine Corps and the Navy will be impressive, but changes to national and especially international spectrum governance are inexplicably slow.

The DON Spectrum Team is "plotting a spectrum revolution," and we are not alone. We are part of a global spectrum revolutionary movement of industry, private consortia and other progressive nations on the leading edge of technology.

A revolution is seldom accomplished alone.

For more information, please go to the DON CIO Web site at www.doncio.navy.mil, or contact the team at DONSpectrumTeam@navy.mil.

TAGS: [Spectrum](#), [Telecommunications](#)

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